What is the relationship between eating out and body weight in adults?

Conclusion

Strong and consistent evidence indicates that children and adults who eat fast food are at increased risk of weight gain, overweight and obesity. The strongest documented relationship between fast food and obesity is when one or more fast food meals are consumed per week. There is not enough evidence at this time to similarly evaluate eating out at other types of restaurants and risk of weight gain, overweight and obesity.

Grade: Strong

Overall strength of the available supporting evidence: Strong; Moderate; Limited; Expert Opinion Only; Grade not assignable For additional information regarding how to interpret grades, click here.

Evidence Summary Overview

The literature review identified six studies: One systematic review (Rosenheck, 2008) and five prospective cohort studies (Duffey, 2007; French, 2000; Li, 2009; Niemeier, 2006; Pereira, 2005). All of the studies were conducted in the US. Studies ranged in sample size from 891 (French, 2000) to 9,919 (Niemeier, 2006), and one study included only women (French, 2000). All six studies looked specifically at fast food consumption, with one study also examining restaurant food consumption (Duffey, 2007). All six studies found a significant, positive relationship between consumption of fast food and body weight in adults. Similar to the research on children, more than one fast food meal consumed per week was associated with increases in BMI (Pereira, 2005). Only one study examined consumption of restaurant food and found that restaurant food consumption was not related to body weight (Duffey, 2007).

Evidence summary paragraphs:

Systematic Reviews (1)

Rosenheck R, 2008 (positive quality) conducted a systematic review to examine the association between fast food consumption and weight gain and obesity. A MEDLINE search included studies that were published through February 2008, were cross-sectional, prospective cohort and experimental studies, had human subjects, and were published in English. The final sample included 16 studies (six cross-sectional, seven prospective cohort, three experimental studies). Findings from cross-sectional studies suggest discrepant associations between fast food frequency and overweight or obesity in terms of body mass index (BMI). Six of the seven prospective cohort studies found a positive association between more frequent fast food consumption and an increase in BMI. Only one experimental study evaluated weight status and increased fast food consumption, and found a positive association between fast food frequency and weight gain. The author concluded that sufficient evidence exists for public health recommendation to limit fast food consumption for reducing weight gain.

Cohort Studies (5)

Duffey KJ et al, 2007 (positive quality) analyzed prospective cohort data from the United States to examine the effects of restaurant and fast food consumption on change in BMI over time. Subjects were from the Coronary Artery Risk Development in Young Adults (CARDIA) Study. Data included in these analyses were from years seven to 10. Fast food and restaurant food consumption frequency was assessed using a questionnaire with open-ended questions, and BMI was calculated using measurement height and weight. The final sample included 3,394 subjects (mean age, 25 years at year seven; mean BMI, 27kg/m^2). Increased consumption of fast food was associated with a positive increase in BMI change over the three-year period (0.0488, 95% CI 0.01 to 0.09, P=0.016). Increased restaurant food consumption was not associated with changes in BMI over the three-year period. The authors concluded that greater fast food, but not restaurant food, intake was associated with higher current BMI and greater increase in BMI over a three-year time period.

French et al, 2000 (positive quality) used data from a cohort of subjects participating in a weight-loss intervention in the United States to examine the relationship between frequency of fast food restaurant use and weight in a community-based sample of adult women. Subjects were from the Pound of Prevention Study, which is an RCT in a community-based setting aimed at using mail-based intervention to encourage healthy eating and exercise. The data use for the present study is for all subjects combined, and uses prospective data from the entire cohort. Weight and height were measured by study personnel and BMI was calculated, and fast food frequency was estimated using questionnaire data. All measurements were completed at baseline and annually for three years. The final sample included 891 women (mean age, 35 years; mean BMI, 27kg/m^2). An increase of one fast food meal per week over the three-year study period was associated with a weight gain of 0.72kg (1.6 lb) above the average weight gain over the three-year period (P<0.01). The authors concluded that increased frequency of fast food restaurant use was associated with greater body weight over time.

Li F et al, 2009 (positive quality) conducted a prospective cohort study to examine neighborhood-built environment characteristics and individual eating-out and physical activity behaviors in relation to one-year change in body weight among adults in the United States. Subjects were from the Portland Neighborhood Environment and Health Study, and were surveyed at baseline and one year later. Subjects had weight and height measured and answered questions regarding their weekly visits to local fast food restaurants at both time points. The final sample included 1,145 subjects (656 men, 489 women; ages 50 to 75 years; mean BMI, 29kg/m^2). Subjects living in high-density fast food neighborhoods who consumed fast food more than one to two times a week had significant increases (1.4±0.61kg) in body weight over one year, compared to those who did not eat fast food (P<0.05). The authors concluded that increase fast food consumption is associated with weight gain over time.

Niemeier HM et al, 2006 (positive quality) analyzed data from a prospective cohort study in the United States to examine the relationship between fast food consumption during adolescence and BMI status in early adulthood. Data from Wave II (1996) and Wave III (2001 to 2002) of the National Longitudinal Study of Adolescent Health was used. Height and weight were measured at both Waves and used to calculate BMI and BMI Z-scores. Frequency of fast food consumption (number of days over the last week) was measured at both waves using a questionnaire. The final sample included 9,919 subjects (age 16 years at Wave II, age 21 years at Wave III; Wave II BMI, 23kg/m^2). Increased fast food consumption at Wave II predicted significantly higher BMI Z-scores at Wave III (P<0.05). Change in fast food consumption between Wave II and III did not significantly predict BMI Z-score at Wave III. The authors concluded that greater fast food consumption during adolescence is associated with increased weight gain during the transition from

adolescence to adulthood.

Pereira MA et al, 2005 (positive quality) analyzed prospective cohort data to investigate the association between reported fast food habits and changes in body weight over a 15-year period in the United States. Subjects were from the Coronary Artery Risk Development in Young Adults (CARDIA) Study, and data from baseline and year 15 assessments were analyzed. Fast food frequency was measured using a structured interview, and body weight was measured by study personnel at each of clinical examination. The final sample included 3,031 subjects (at baseline, mean age was 25 years; mean BMI was 25kg/m^2). A difference in year zero fast food frequency of three times a week was associated with mean gains of 2.2kg in black subjects (P=0.014) and 1.6kg in white subjects (P=0.064). Change in fast food frequency over 15 years was also independently associated with changes in body weight in white subjects (1.8kg, P<0.001), with a weaker association in black subjects (0.7kg; P=0.1053). Compared to participants with infrequent fast food intake (less than one time a week), those with frequent (more than two times a week) consumption of fast food gained an extra 4.5kg at follow-up (P=0.0054). The authors concluded that fast food consumption has a strong positive association with weight gain, suggesting that fast food increases the risk of obesity.

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Author, Year, Study Design, Class, Rating	Participants	Methods: Diet Assessment, Adiposity Measurement	Outcomes
Duffey KJ, Gordon-Larsen P et al, 2007 Study Design: Prospective Cohort Study Class: B Rating:	N=3,394 subjects (mean age, 25 years at year seven; mean BMI, 27kg/m^2). Location: United States.	Subjects were from the Coronary Artery Risk Development in Young Adults (CARDIA) Study. Data included in these analyses were from years seven and 10. Fast food and restaurant food consumption frequency was assessed using a questionnaire with open-ended questions, and BMI was calculated using measurement height and weight.	Increased consumption of fast food was associated with a positive ↑ in BMI change over the three-year period (0.0488, 95% CI: 0.01 to 0.09, P=0.016). ↑ restaurant food consumption was not associated with Δs in BMI over the three-year period.
French SA, Harnack L et al, 2000 Study Design:	N=891 women (mean age, 35 years; mean BMI, 27kg/m^2). Location: United	Subjects were from the Pound of Prevention Study, which is an RCT in a community-based setting aimed at using mail-based	An ↑ of one fast food meal per week over the three-year study period was associated with a weight gain of 0.72kg (1.6lb)

Prospective Cohort Study Class: B Rating:	Location: United States.	intervention to encourage healthy eating and exercise. The data use for the present study is for all subjects combined, and uses prospective data from the entire cohort. Weight and height were measured by study personnel and BMI was calculated, and fast food frequency was estimated using questionnaire data. All measurements were completed at baseline and annually for three years.	above the average weight gain over the three-year period (P<0.01).
Li F, Harmer P et al, 2009 Study Design: Prospective Cohort Study Class: B Rating:	N=1,145 subjects (656 men, 489 women; ages 50 to 75 years; mean BMI, 29kg/m ^{2}). Location: United States.	Subjects were from the Portland Neighborhood Environment and Health Study, and were surveyed at baseline and one year later. Subjects had weight and height measured and answered questions regarding their weekly visits to local fast-food restaurants at both time points.	Subjects living in high-density fast food neighborhoods who consumed fast food more than one to two times a week had significant ↑ (1.4±0.61kg) in body weight over one year, compared to those who did not eat fast food (P<0.05).
Niemeier et al 2006 Study Design: Prospectibe cohort study Class: B Rating:	N=9,919 subjects (age 16 years at Wave II, age 21 years at Wave III; Wave II BMI, 23kg/m^2). Location: United States.	Data from Wave II (1996) and Wave III (2001 to 2002) of the National Longitudinal Study of Adolescent Health was used. Height and weight were measured at both Waves and used to calculate BMI and BMI Z-scores. Frequency of fast food consumption (number of days over the last week) was	Increased fast food consumption at Wave II predicted significantly ↑ BMI Z-scores at Wave III (P<0.05). Change in fast food consumption between Wave II and III did not significantly predict BMI Z-score at Wave III.

		measured at both waves using a questionnaire.	
Pereira M, Kartashov A et al, 2005 Study Design: Prospective Cohort Study Class: B Rating:	N=3,031 subjects (at baseline: Mean age, 25 years; mean BMI, 25kg/m^2). Location: United States.	Subjects were from the Coronary Artery Risk Development in Young Adults (CARDIA) Study, and data from baseline and year 15 assessments were analyzed. Fast food frequency was measured using a structured interview, and body weight was measured by study personnel at each of clinical examination.	A difference in year zero fast-food frequency of three times a week was associated with mean gains of 2.2kg in black subjects (P=0.014) and 1.6kg in white subjects (P=0.064). Change in fast food frequency over 15 years was also independently associated with Δs in bodyweight in white subjects (1.8kg, P<0.001), with a weaker association in black subjects (0.7kg; P=0.1053). Compared to participants with infrequent fast food intake (< one time a week), those with frequent (> two times a week) consumption of fast food gained an extra 4.5kg at follow-up (P=0.0054).
Rosenheck R, 2008 Study Design: Meta-analysis or Systematic Review Class: M Rating:	N=16 studies (six cross-sectional, seven prospective cohort, three experimental studies).	A MEDLINE search included studies that were published through February 2008, were cross-sectional, prospective cohort and experimental studies, had human subjects, and were published in English.	Findings from cross-sectional studies suggest discrepant associations between fast food frequency and overweight or obesity in terms of BMI. Six of the seven prospective cohort studies found a positive association between more frequent fast-food consumption and an ↑ in BMI. Only one experimental

			study evaluated weight status and increased fast food consumption, and found a positive association between fast food frequency and weight gain.

Research Design and Implementation Rating Summary
For a summary of the Research Design and Implementation Rating results, click here.

Worksheets

Duffey KJ, Gordon-Larsen P, Jacobs DR Jr, Williams OD, Popkin BM. Differential associations of fast food and restaurant food consumption with 3-y change in body mass index: The Coronary Artery Risk Development in Young Adults Study. *Am J Clin Nutr.* 2007 Jan; 85 (1): 201-208.

French SA, Harnack L, Jeffery RW. Fast food restaurant use among women in the Pound of Prevention study: Dietary, behavioral and demographic correlates. *Int J Obes Relat Metab Disord.* 2000 Oct; 24 (10): 1,353-1,359.

Li F, Harmer P, Cardinal BJ, Bosworth M, Johnson-Shelton D, Moore JM, Acock A, Vongjaturapat N. Built environment and 1-year change in weight and waist circumference in middle-aged and older adults: Portland Neighborhood Environment and Health Study. Am J Epidemiol. 2009 Feb 15; 169(4): 401-408. Epub 2009 Jan 19.

Niemeier HM, Raynor HA, Lloyd-Richardson EE, Rogers ML, Wing RR. Fast food consumption and breakfast skipping: predictors of weight gain from adolescence to adulthood in a nationally representative sample. *J Adolesc Health.* 2006 Dec;39(6):842-9. Epub 2006 Sep 27.

Pereira MA, Kartashov AI, Ebbeling CB, Van Horn L, Slattery ML, Jacobs DR Jr, Ludwig DS. Fast-food habits, weight gain and insulin resistance (the CARDIA study): 15-year prospective analysis. *Lancet.* 2005 Jan 1-7; 365 (9,453): 36-42. Erratum in: *Lancet.* 2005 Mar 16; 365 (9,464): 1,030.

Rosenheck R. Fast food consumption and increased caloric intake: A systematic review of a trajectory towards weight gain and obesity risk. *Obes Rev.* 2008 Nov; 9 (6): 535-547. Epub 2008 Mar 14. Review.